Oct. 16, 1928. 1,687,522

E. G. STAUDE

ATTACHMENT FOR PAPER SLOTTING MACHINES

Filed Dec. 31, 1923 5 Sheets-Sheet 1

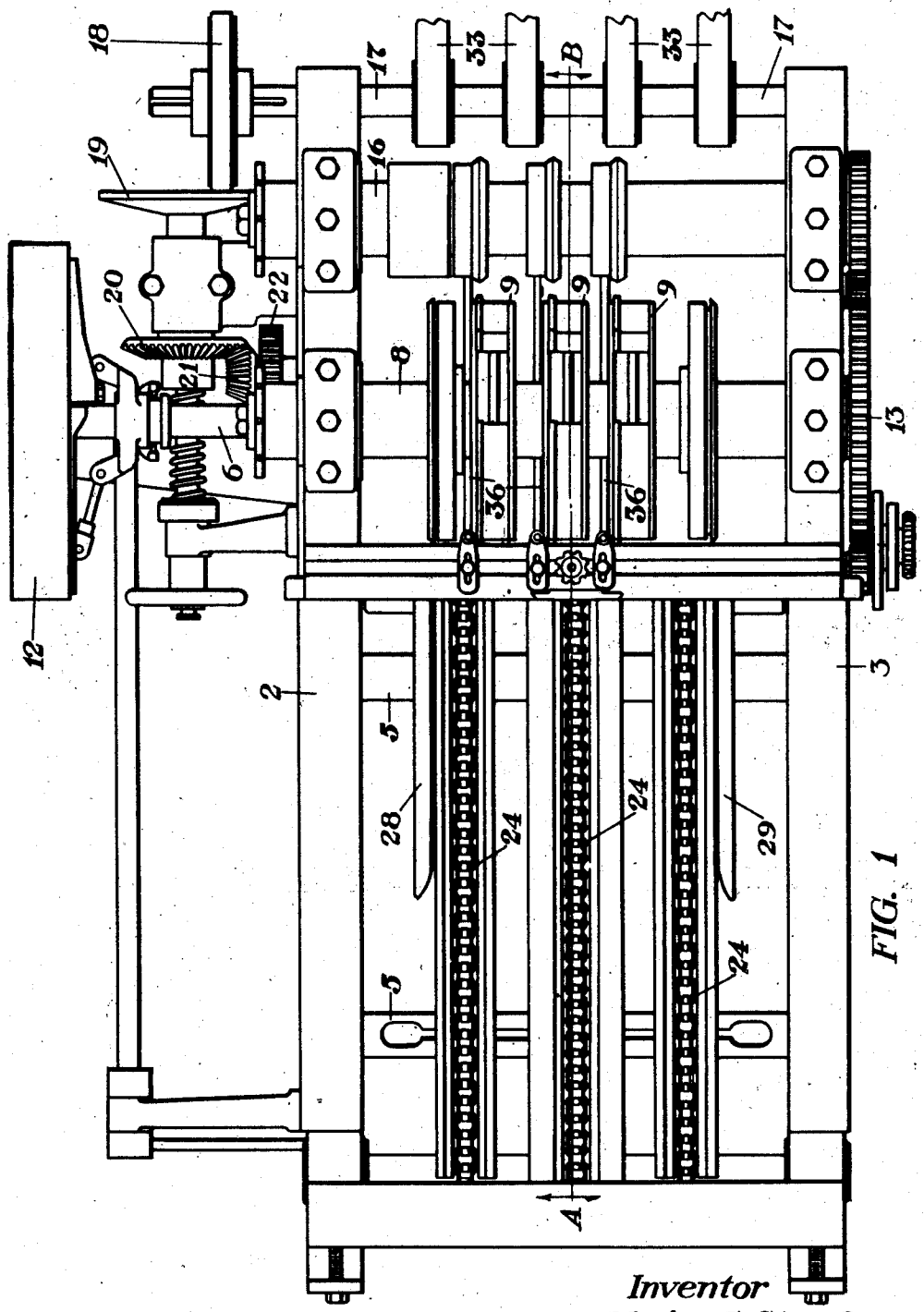


FIG. 1

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Filed Dec. 31, 1923 5 Sheets-Sheet 2

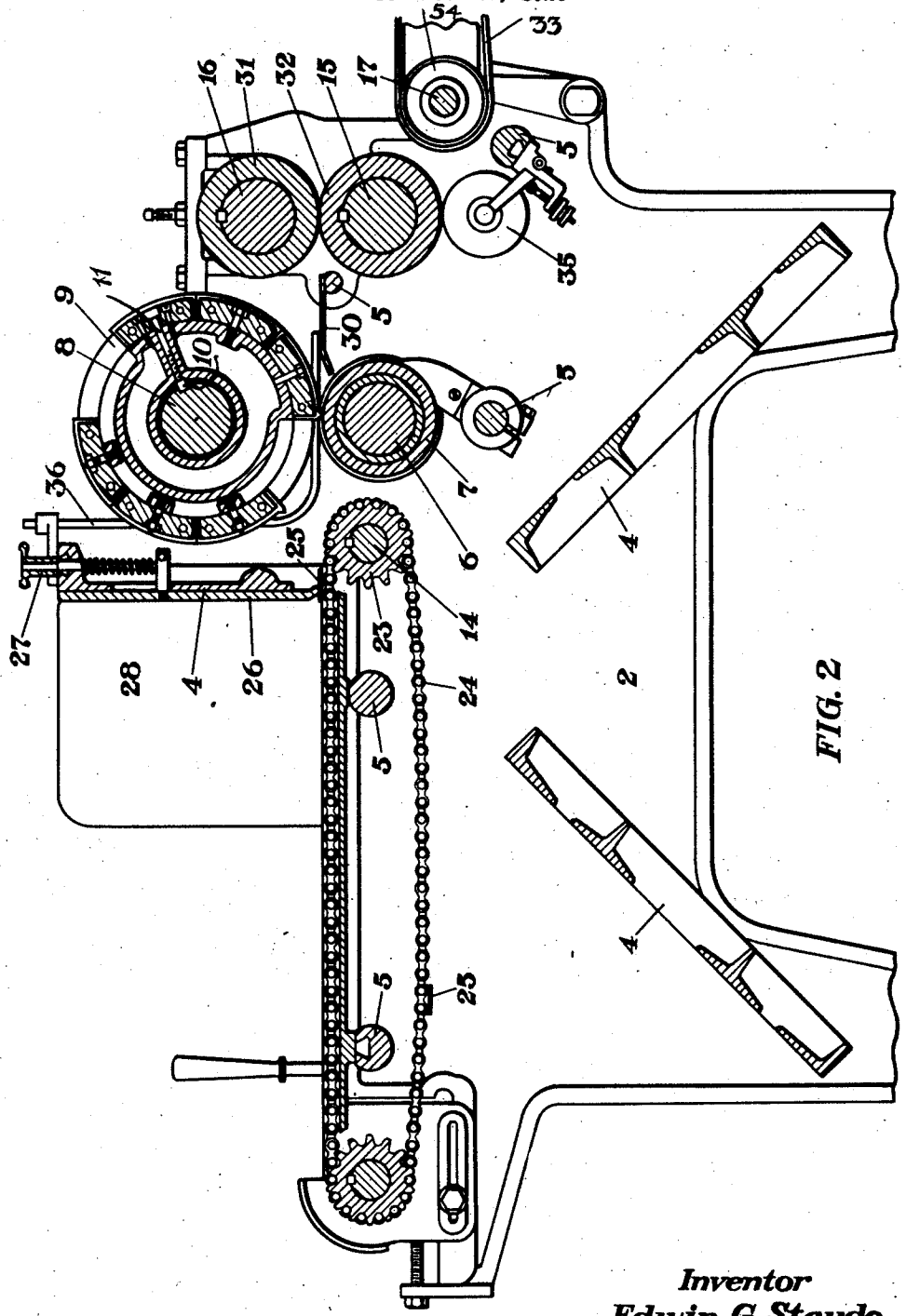


FIG. 2

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Filed Dec. 31, 1923 5 Sheets-Sheet 3

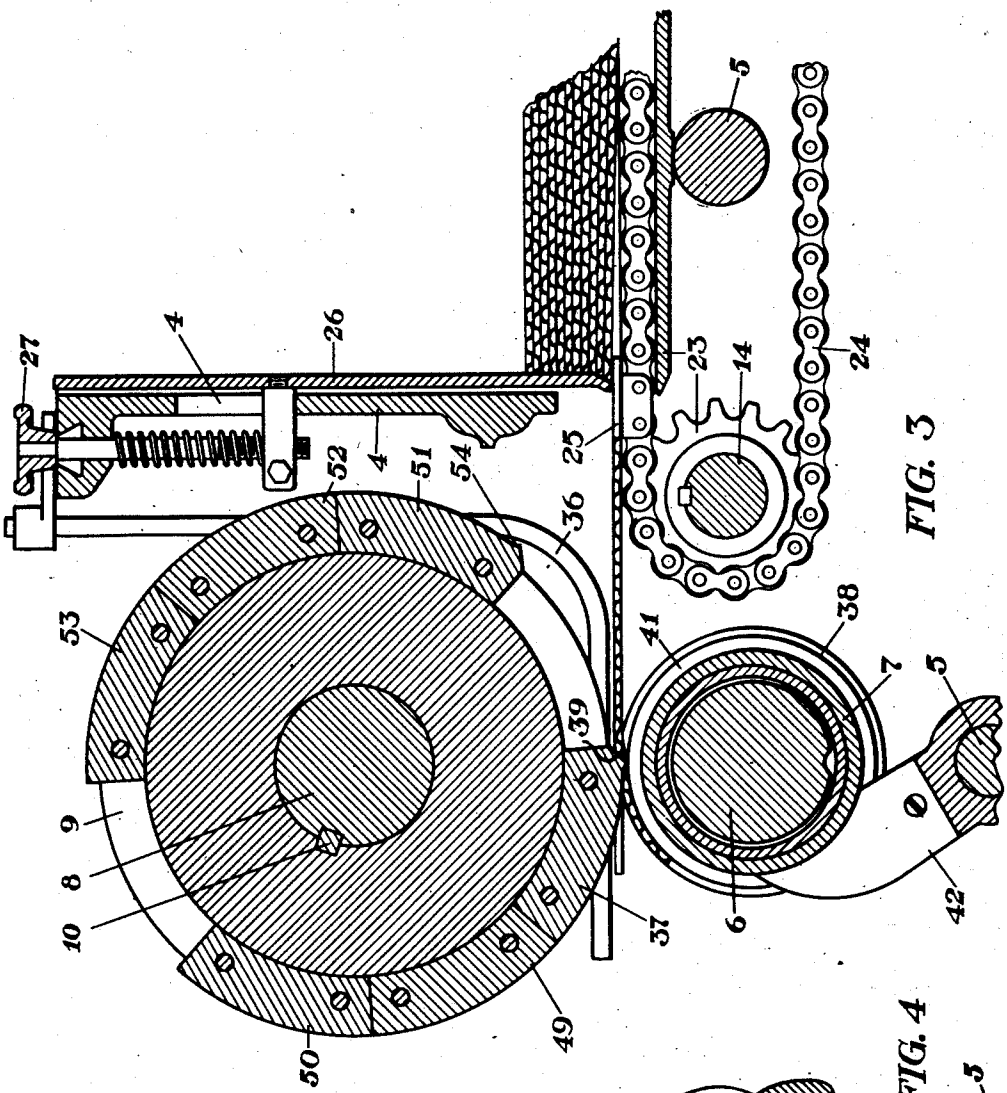


FIG. 3

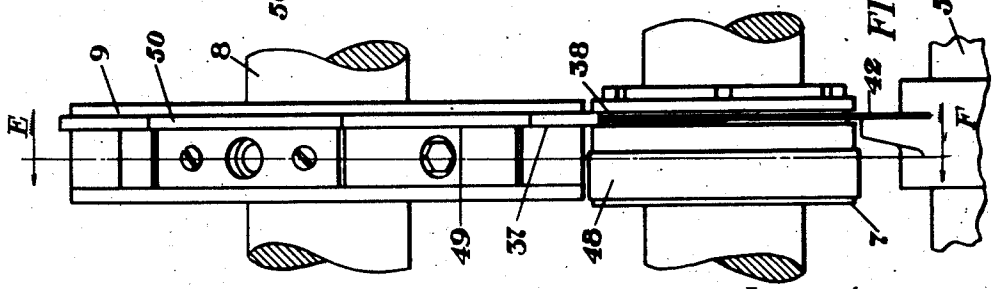


FIG. 4

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Filed Dec. 31, 1923 5 Sheets-Sheet 4

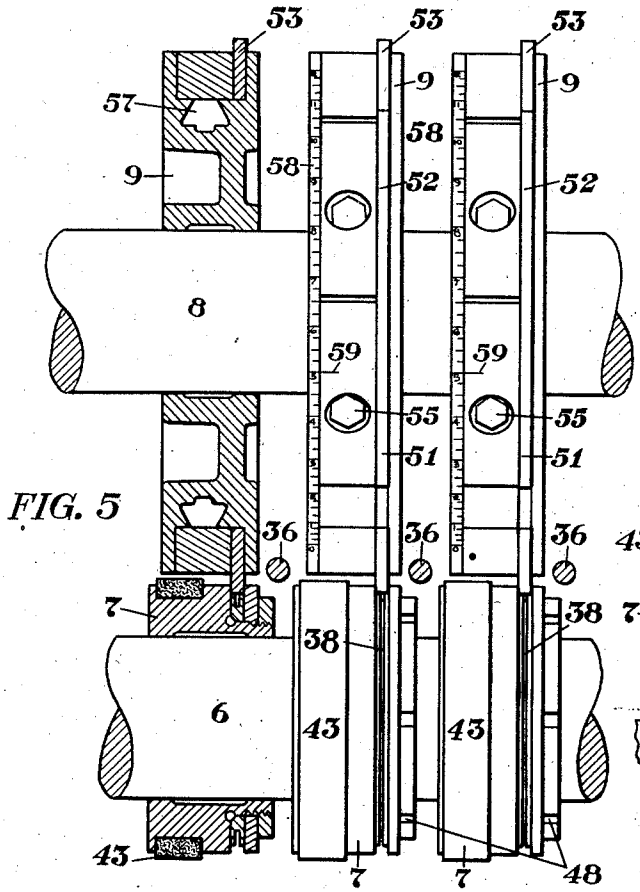


FIG. 5

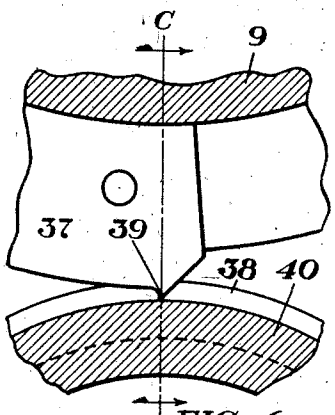


FIG. 6

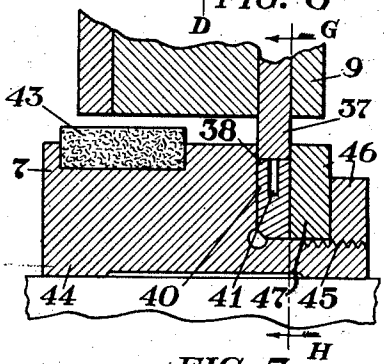


FIG. 7

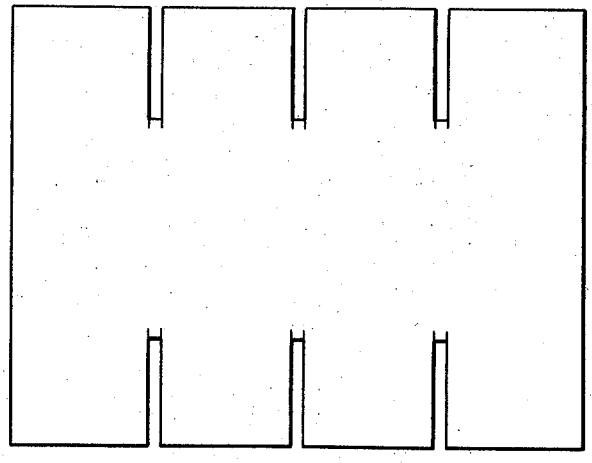


FIG. 9

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ATTACHMENT FOR PAPER SLOTTING MACHINES

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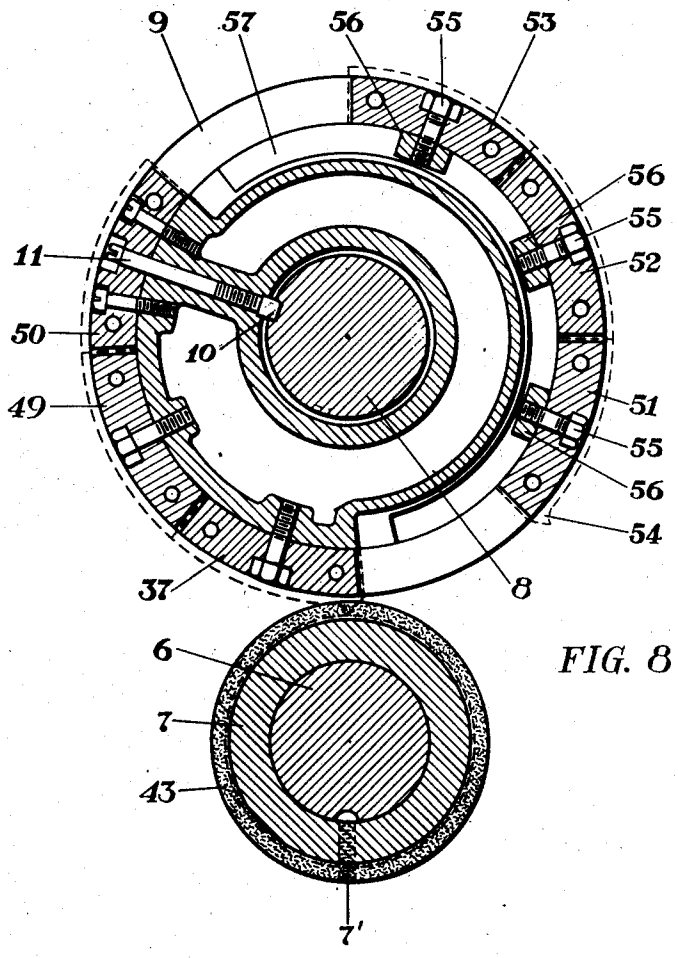


FIG. 8

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Patented Oct. 16, 1928.

1,687,522

UNITED STATES PATENT OFFICE.

EDWIN G. STAUDE, OF MINNEAPOLIS, MINNESOTA.

ATTACHMENT FOR PAPER-SLOTTING MACHINES.

Application filed December 31, 1923. Serial No. 683,773.

My invention relates to machines for slotting paper blanks generally and is particularly adapted for use in the manufacture of corrugated or fiber containers and like articles.

My present invention is an improvement over the invention described and claimed in Letters Patent of the United States, issued to me June 6, 1922, #1,418,844.

The object of my present invention is to simplify and improve the device of my former patent by providing means for positively cutting the tongues or strips to form the slot without the necessity of using timing gears which require accurate adjustment to properly coact with a knife or die.

A further object is to provide a slotting head wherein the distance between the upper and lower slot in the blank may be varied by adjustment of the knives.

A further object is to provide a cutting knife by the operation of which the material may be bent into the bottom of the lower die and cut off by the anvil knife without tearing.

A further object is to provide for the feed of stock of varying thickness and construction of slotting head which can be taken apart for grinding or sharpening the cutting edges.

A further object is to provide means to prevent stock from winding on the upper slotting head and an improved feeding device for operation in combination with the slotting heads.

The invention consists generally in various constructions and combinations all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a plan view of a container, blank-slotting and parallel-creasing machine;

Figure 2 is a longitudinal sectional view on the line A—B of Figure 1 looking in the direction of the arrow;

Figure 3 is an enlarged section through a portion of the automatic feeder and the slotting heads looking in the opposite direction from the view in Figure 2;

Figure 4 is a rear view of the slotting head showing the position of the slotting knives and cut-off knife;

Figure 5 is a view similar to Figure 4 showing a plurality of the slotting heads one of them being shown in section;

Figure 6 is a detail sectional view of the upper portion of the lower die;

Figure 7 is a view similar to Figure 6 taken on the line C—D of Figure 6 looking in the direction of the arrow;

Figure 8 is an enlarged view of the cutting heads;

Figure 9 is a plan view of an ordinary container blank after the slotting operation has been performed.

In the drawing, 2 and 3 represent the left and right frames of the machine held together by suitable spreaders 4 and connecting bars 5 which insure the necessary rigidity. 6 is a drive shaft on which the lower cutting dies 7 are mounted, secured by suitable means such as set screws 7′, see Figure 8. Above the shaft 6 is a shaft 8 on which the upper cutting head 9 is mounted and secured by a suitable key 10 held in place by set screw 11, said key operating in a groove in the shaft 8 to allow for lateral adjustment. A clutch pulley 12, Figure 1, is mounted on the shaft 6 and a suitable train of gears 13, Figure 1, drives the respective shafts 6 and 8 and also a suitable shaft 14 which operates the feed chains 24 to move the blanks one at a time out of the hopper. Shafts 15 and 16 upon which are mounted parallel creasing rolls are also driven from the gears 13. A shaft 17 is driven by a variable friction wheel 18, Figure 1, bearing against the disk wheel 19 and driven by bevel gears 20 and 21. The gear 21 is driven by a spur gear 22 and takes its power from the shaft 6. On the shaft 14 are suitable sprockets 23 carrying the said feeder chains 24 having thereon a short bar 25 which is adapted to contact with the rear of the bottom blank in the hopper and push it under the gate 26, see Figure 3, to the cutting heads 7 and 9. The vertical adjustment of the gate 26 is regulated by the hand wheel 27 and its connections as shown in Figure 3.

The pile of blanks is held in place in the hopper by the upright plates 28 and 29, see Figure 1. A plate 30, see Figure 2, guides the blank after it is slotted through the creasing rolls 31 and 32 and from these rolls the blank passes to a slow moving conveyor 33, operating on pulleys 34 supported by the shaft 17. 35 indicates a suitable manufac-

turer's certificate printing apparatus. The stock is prevented from winding on the upper cutting heads 9 by stripper bars 36, see Figure 2.

Referring to Figures 3 to 8 in which the cutting heads are particularly shown, it will be noted that as the chains 24 advance the lower blank into the cutting heads, the knife 37, see Figure 3, mounted in the upper cutting head coacting with the groove 38 in the lower die 7 will cut along both sides of the tongue, and at the one end of the knife 37 a chisel-shaped cutting edge 39 is provided extending transversely of the knife, and coacting with the bottom 40 of the slot 38 cuts across the tongue formed by the knife 37 leaving it depending by a narrow piece of stock corresponding in width to the groove 41 in the bottom of the slot. The knife 37 cooperating with both sides of the slot 38 will cut out the sides of the tongue and the cutting edge 39 striking the bottom 40 of the slot will sever the stock except where it lies over the narrow groove 41, the partially severed tongue dropping into this groove and being removed by the clean-out device 42. The cutting edge 39 does not entirely sever the end of the tongue but the material is so nearly severed that it will be held by friction against the side walls of the groove and will pull away from the blank and be removed by the clean-out device.

I regard this tongue-cutting device a valuable feature of the machine as it does away with the high "fang" tooth in general use on machines of this type which is intended to penetrate the material before the sides of the tongue are completely severed. This form of tooth has a tendency to tear the rear end of the slot in the revolution of the upper head. My improvement makes a clean cut of the tongue and the slot is always the same depth and no timing gears are required, the use of which prevents rapid adjustment of the machine for different sizes of work. Furthermore, the use of timing gears necessitates extreme care in adjustment to make the coacting knives register properly.

The shaft 8 is adjusted so that the cutting edge 39 will touch the bottom 40. No further adjustment of the upper and lower cutting heads being provided to compensate for the different thicknesses of stock, I provide a band or tire 43 of yielding material on the lower slot head 7 that is adapted to yield and allow the material to be fed evenly between the heads.

For the purpose of assembling the lower cutting head and providing means for sharpening the cutting edges, I provide the part 44 with a thread portion 45 and a locking ring 46, see Figure 7, and between the locking ring and the wall of the part 44, I arrange the ring 40 forming the bottom of the slot 38 and with which the cutting edge 39 contacts in the operation of cutting the tongue. The ring 47 is interposed between the rings 46 and 40, see Figure 7, and may be removed with the ring 46 to allow access to the cutting edges of the slot 38 and the ring 47 for sharpening purposes. The ring 46 is tightened by a spanner wrench fitting slots 48, see Figure 9.

To cut a deep slot in the blank of greater length than the knife 37 I provide additional knives 49 and 50, see Figure 8, mounted on suitable blocks in alinement with knife 37 and removable from the cutting head, but adapted as shown in Figure 3 to form a continuation of the knife 37. To cut a short slot the knives 49 and 50 may be removed. Upon the opposite side of the cutting head, I provide knives 51, 52 and 53; the knife 51 having a raised cutting edge 54 corresponding to the edge 39 except that it is extended in the opposite direction.

To vary the distance between the cutting edges 39 and 54 for cutting blanks of different sizes, I loosen the cap screws 55, see Figure 5, to permit the nut 56, see Figure 8, to slide freely in the bevel groove 57, see Figure 8. When the knives have been properly adjusted, I clamp the cap screws, thereby firmly holding the knives in their cutting position. To facilitate the adjustment of the cutting edges 39 and 54, I prefer to provide a graduated scale 58 on the upper cutting head, see Figure 5. A line 59 is provided on the block 51 and when the block is adjusted so that the line 59 registers with the line 5 of the scale, the operator will understand that the distance between the cutting edges 39 and 54, is exactly five inches. I am therefore able with this arrangement to very quickly and accurately adjust the knives for the varying sizes of stock and articles to be cut.

In various ways, the details of construction herein shown and described may be modified and still be within the scope of my invention.

I claim as my invention:

1. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared to form a tongue, said knife having a transverse cutting edge, adapted to partially sever said tongue transversely from the stock and a cleaning device operating in said slot nearer the axis of said revolving member than said cutting edge to engage the tongue so partially severed and remove it from said slot.

2. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a flat bottom, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared to form a tongue, said knife having a transveres cutting edge to enter said slot and en-

gage said tongue between it and the bottom of said slot to make a partial separation of the tongue from the stock, and means operating nearer the axis of said first-named revolving member than said cutting edge to complete the removal of the tongue from said slot.

3. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a comparatively narrow groove in the bottom of said slot, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared, said knife having a transverse cutting edge adapted to enter said slot and bridge said groove therein and cooperate with the bottom of said slot to sever the stock on both sides of said groove and partially sever the stock over said groove and means operating in said groove to remove the severed stock.

4. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a flat bottom having a narrow groove therein, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared to form a tongue, said knife having a transverse cutting edge adapted to enter said slot and sever said tongue transversely from the stock except for that portion thereof over said groove, and a yielding means interposed between said revolving members to compensate for variation in the thickness of the stock.

5. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a comparatively narrow groove in the bottom of said slot, a second revolving member, knives mounted thereon between which and the edges of said slot the paper stock is sheared, said knives having transverse cutting edges adapted to enter said slot and cooperate with the bottom thereof and with said groove to partially sever the tongue formed in said slot by said knives, said knives having means adapting them for circumferential adjustment toward and from each other to cut slots of different sizes.

6. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a comparatively narrow groove in the bottom of said slot, a second revolving member, knives mounted thereon between which and the edges of said slot the paper stock is sheared, said knives having transverse cutting edges adapted to enter said slot and cooperate with the bottom thereof and with said groove to partially sever the tongue formed in said slot by said knife, said knives having means adapting them for circumferential adjustment toward and from each other to cut slots of different sizes, and a scale device whereby the desired adjustment of said knives may be determined.

7. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges and a comparatively narrow groove in the bottom of said slot, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared, said knife having transverse cutting edges adapted to enter said slot and cooperate with the bottom thereof to sever the tongue formed by said knife upon both sides of said groove and cause said tongue to drop into said groove, and a clean-out device operating in said groove and adapted to remove the tongue from said groove and the stock.

8. A paper stock slotting machine comprising a revolving member having an annular recess at one end, a ring of less diameter than said member fitting within said recess and having a narrow peripheral groove therein, a second ring of substantially the same diameter as said member seated against said first named ring, and forming with the opposite wall of said recess an annular slot, means for locking said rings together and allowing their convenient removal and access to the edges of said recess, a second revolving member, a knife mounted thereon adapted to enter said slot and having longitudinal edges to cooperate with the edge of said recess and the opposite edge of said second ring to make a shear cut, and said knife having a transverse cutting edge projecting beyond said longitudinal edges and cooperating with the bottom of said slot to sever the tongue formed by said knife on both sides of the groove in said first named ring.

9. A paper stock slotting machine comprising a revolving member having peripheral slots therein provided with cutting edges and comparatively narrow grooves in the bottoms of said slots, a second revolving member, knives mounted thereon adapted to register with said slots and make a shear cut of the stock with the edges of said slot, the tongues cut out by said knives being severed upon both sides of said grooves and dropping into said grooves, and being removed from the stock by frictional engagement with the walls of said slots, and clean-out devices operating in said grooves to remove said tongues so separated.

10. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared to form a tongue, and said knife having a transverse cutting edge projecting outwardly beyond its shearing edges and cooperative with the bottom of the slot of the first mentioned revolv-

ing member and adaped to partially sever said tongue from the stock.

11. A paper blank slotting machine comprising a revolving member having a peripheral slot provided with cutting edges, a second revolving member, a knife mounted thereon and adapted to enter said slot and cooperate with the edges thereof to make a shear cut in the blank fed between them, and means projecting beyond said shearing edges and cooperating with the bottom of said slot for partially severing the tongue cut from said slot at its junction with the blank.

12. A paper stock slotting machine comprising a revolving member having a peripheral slot provided with cutting edges, a second revolving member, a knife mounted thereon between which and the edges of said slot the paper stock is sheared to form a tongue, said knife having a transverse cutting edge adapted to enter said slot and cooperate with the bottom thereof to partially sever said tongue transversely of the stock, and a yielding means interposed between said revolving members to compensate for variation in the thickness of the stock.

13. A paper stock slotting device, comprising a rotatable member having a peripheral slot, a second rotatable member having a radial blade, as an annular segment slidably fitting within the slot of the first member, said segment having a transverse peripherally raised portion, as a cutting edge adapted to engage the bottom of the slot, the edges of said slot and blade cooperating to shear the material as the members are rotated.

14. A paper stock slotting device, comprising a rotatable member having a peripheral slot, a second rotatable member having a radial blade, as an annular segment slidably fitting within the slot of the first member, said segment having a transverse peripherally raised portion, as a cutting edge adapted to engage the bottom of the slot, the edges of said slot and blade cooperating to shear the material as the members are rotated, and a band of resilient material surrounding one of said rotatable members.

15. A device of the class described, comprising a disk having a terminal counter-turned portion, an annulus seated upon said portion and having a peripheral groove therein, and of less diameter than the disk, a second annulus of the same diameter as the disk, also seated upon said portion and abutting said first annulus, and a third annulus clampingly securing the annuli, and said annuli being substantially rectangular in cross section.

16. A device of the class described, comprising a disk having a peripheral circumferential groove, said groove having a circumferential dove-tail groove in its bottom, a plurality of segmental annular shearing elements circumferentially adjustable in said first groove and projecting beyond the periphery of the disk, and having clamping portions slidable in the dove-tail groove, the periphery of certain of said shearing elements having a peripherally raised transverse portion providing a transverse cutting edge.

17. A device of the class described, comprising a rotatable cutter disk having a peripheral groove therein, a second cutter disk having a circumferential blade, said blade and groove cooperating to shear the stock, said blade having a transversely disposed cutting edge adapted to engage the bottom of the groove, and said blade circumferentially adjustable, and said blade and disk having graduations for obtaining accurate circumferential adjustment of the blade.

In witness whereof, I have hereunto set my hand this 26th day of December, 1923.

EDWIN G. STAUDE.